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From a private source, the Rev. E. H. Bellairs, of Christ Church, England, has obtained the information from the Principal Statistical Department of Customs, that the value of honey imported into Great Britain during the month of January, 1885, amounted to £804 in value, or about \$4,000. This came principally from America.

A correspondent asks what is the necessary degree of heat in order for bees to work at comb building and brood-rearing in the hive. It should be about 95° Fahr. The degree of heat in a hive even in winter, is much more than it is generally thought to be. In January, a thermometer standing near an apiary, indicated 7° below the freezing point, but when the bulb was inserted a little way into the entrance of a hive, it rose 23° above that point. Had it been inserted into the cluster, it would have indicated a much higher figure.

The honey-dew stores which many bee-keepers allowed their bees to retain for winter food, have killed myriads of bees. The BEE JOURNAL gave due warning last August in these words: "If the fall honey crop should be a poor one, the bees may have nothing upon which to subsist during the coming winter, except this secretion of the aphidæ, misnamed honey-dew, and the result of such a state of affairs may be very detrimental—spreading disease and death all around. We give this word of warning thus early, so that no one may have an excuse for neglecting the matter until it is too late, and thus entail a severe loss of bees during the next winter." Now, the losers are *mourning*.

Honey Crop of Southern California.

The following from Mr. J. E. Pleasants, of Los Angeles, Cal., was read at the Bee Congress at New Orleans:

The honey business of Southern California has sprung up within the last 10 or 12 years; and when we consider that the product in a favorable season amounts to 20,000,000 pounds, and that this honey is up to the highest standard of excellence in quality, we have a realization of the importance of the industry, not only to Southern California, but to the world at large.

The chief season for honey production lasts during eight months of the year, while there is no part of the year in which it is not produced, the only cessation of work by the bees being during a comparatively few days of unfavorable weather. The great variety of honey-producing plants, rich in nectar, makes this the natural home of the honey-bee, and the paradise of the apiarist; while, for any other purpose, much of this region is a barren waste, with no other redeeming quality but its genial sunshine. It is no wonder, therefore, that the full attention of individuals is given up to this business. If we examine the statistics we shall find that though bee-keeping is in its infancy, the honey product of this section exceeds that of all the country east of the Rocky Mountains combined. No where else is such extensive and systematic attention given to the business.

The willows and alfilarilla, which grow in abundance, furnish the earliest food for the bees. Then follow the wild sage, the wild alfalfa, wild buckwheat, wild coffee, bearberry and sumac. The sage, alfalfa and sumac are the most abundant in nectar, and are plants from which the choicest of our honey is obtained.

I would estimate that about three-fifths of the product is exported. A large share of it finds a market in Germany, Glasgow, Paris and Liverpool, far the largest share going to the latter place; besides, markets are being opened up in the eastern States of our own country, as well as in China; and I may add that most of the quantity exported is extracted from the comb. I have no doubt, from the favor with which our honey is received, that it will find an increased and ready market in proportion to the prospective amount of production. It is apparent that the present price of honey brings it within the reach of all, while the prospects of lower freight will tend to increase the production and profits of the producer.

To epitomize, the following figures are given in this connection: Estimate of the honey business of southern California is as follows: Number of bee-keepers, 1,000; colonies of bees, 100,000; amount of honey to the colony, 200 pounds, or in all, 10,000 tons. The wax amounts to 5 pounds to the colony, or makes this product amount to 500,000 pounds; at the market value of 25 cents per pound, we have

the snug sum of \$125,000 for the wax alone. The quality of this honey and wax equals any in the world, not excepting the honey product of the islands of Crete and Minorca; and the time is not far distant when the gorges and canyons of Southern California, which abound in the honey-producing plants, will become the homes of a happy and prosperous population engaged in the honey industry.

Mr. Arthur Todd, of Germantown, Pa., requests us to make the following announcement. He says:

I am just in the receipt of a letter from Frank Cheshire, Esq., of London, in which he says: "I should regard a little piece of comb containing the remains of larvae dead of foul brood, as a great acquisition, since it would enable me to determine the identity or otherwise of the bacilli on the two sides of the Atlantic."

Will you kindly give this publicity in the Weekly BEE JOURNAL, so that some one in possession of samples of foul brood may aid in valuable researches by mailing as requested? Address, "Mr. Frank Cheshire, Avenue House, Acton, London, England."

In mailing, be kind enough to pack securely in wadding, enclosed in a wooden box, so that the samples will not be useless when they reach London.

ARTHUR TODD.

We do not like the idea of sending such through the mails. If it is sent, however, it should be securely packed and protected, as requested above.

H. C. Austin, Austin's Springs, Tenn., on March 27, 1885, writes thus concerning the photographs taken at the late bee-keepers' congress:

I have just received the photograph of the late bee-keepers congress, but it is not gotten up according to agreement. As a member of the committee making the contract, I will say that it was plainly understood that the photographs were to be numbered, mounted, burnished, and mailed between two wooden boards; yet the bee-keepers are not numbered, it is not mounted, neither is it burnished. I do not want bee-keepers to think that the committee would knowingly get them to pay 75 cents each for work done in that style.

As nearly all those represented were personally unacquainted with each other, the photograph as it is of but little use to them. Should not the committee have procured "numbers" for each person to be pinned to their breasts and thus appear on the photographs? Then it would have been an easy matter to have the names, correspondingly numbered, printed at the bottom. Perhaps this might yet be remedied, and new ones obtained. What does Mr. Winder say to this?

QUESTIONS

WITH

REPLIES by Prominent Apiculturists.

Winter Passages in Combs.

Query, No. 45.—Do bees make their winter passages in the combs? I have noticed when I transfer bees and combs from box-hives, that some of the combs have nice round holes in them about $\frac{1}{2}$ of an inch in diameter.—East Saginaw, Mich.

DR. G. L. TINKER answers as follows: "It is common to find passages through the combs in box-hives, but where sheets of foundation are used in the brood-chamber, the bees do not often make holes through them, and when winter passages are cut in the fall, they are soon closed unless a wooden tube is inserted. Many colonies on deep frames are lost every winter for the want of passages for the bees to cross to other combs containing honey. With a shallow brood-frame they do not seem to be necessary, as the bees and queen can easily and safely pass under the combs in cold weather, to other parts of the hive. I think this the strongest argument in favor of a shallow frame for winter. Should bee-keepers adopt reversible frames and all combs be extended to the bottom of the frames, I predict that winter passages will be necessary, and one of the best features of the Langstroth frame for winter will be lost. I think that cross-sticks over the frames in winter are a nuisance."

PROF. A. J. COOK says: "They do not. The holes were accidental."

DADANT & SON answer thus: "Bees do not make passages in the combs in preparing for winter."

W. Z. HUTCHINSON replies thus: "I think that it is the cross-sticks in the box-hives that cause the bees to leave holes."

G. M. DOOLITTLE says: "The holes are where the bees have taken out moth-larvae or some other offensive substance, some of the comb having been removed with it. I formerly used winter passages, but in late years I have considered them a nuisance."

G. W. DEMAREE answers thus: "I have transferred many colonies of bees from box-hives, and have never seen any uniformity of comb-building. I have frequently seen the little round holes mentioned in the question, but I have noticed that they are as likely to be found in one part of the hive as in another. This shows that there is no system in comb-building when bees are left without a guider, except in spacing the cells, and as curious as it may seem, some colonies excel in this handiwork."

DR. C. C. MILLER replies thus: "Only by accident, as where the bees have gnawed a hole where worms have been, or sometimes where a queen-cell has been."

JAMES HEDDON answers as follows: "I do not think that bees ever leave holes through their combs, with a view of using them for winter passage-ways. The irregularity of the combs in box-hives, caused in part by the usual cross-sticks, and in part by the lack of better guides that higher intelligences now furnish them, act as a cause for these holes."

Queenless Colonies in the Spring.

Query, No. 46.—What is the best thing to do with queenless colonies in early spring? If it is best to unite them, what is the best method of doing it?—G. A. M.

G. W. DEMAREE answers as follows: "Doubtless 'locality' will stand in the way of a uniform opinion on this subject. There are two classes of queenless colonies found in the spring—the colony that has wintered without a queen, and the colony that loses its queen in the spring. The former never has a fertile worker; the latter sometimes does. If the colony starts queen-cells promptly, I never fail to save them by giving them a piece of comb containing larvae just hatched. The proper time to give the larvae is when the first sealed drone-brood is found in the apiary. I save 2 or 3 colonies every spring in this way, and they give as good returns as other colonies."

W. Z. HUTCHINSON replies thus: "If there are but few colonies, secure a queen from the South for a queenless colony. If the bee-keeper has bees enough to gather the nectar from the area that is bee-flight from his apiary, it is no object to preserve the colony, and it can be joined to another colony by simply shaking the bees in front of the hive."

G. M. DOOLITTLE says: "If the queenless colony is in fair strength, give it a frame of brood once a week from other colonies, until a laying queen can be had. If it is a weak one, it will hardly pay for the fussing with."

DADANT & SON answer thus: "If a queenless colony is strong after winter, give it some brood from other colonies; if weak, unite it with another."

PROF. A. J. COOK remarks thus: "To unite them. By short removes get the colony close side by side with the one to which it is to be united. Smoke them thoroughly, so as all the bees will fill themselves with honey, then place all in one hive, alternating frames. This never fails with me."

DR. C. C. MILLER says: "Unite with a weak colony having a fertile queen. If united at the time of first spring flight, there will be little trouble if frames with adhering bees are put from one hive into the other."

JAMES HEDDON replies as follows: "It is usually best to give up the identity of the colony, and unite the bees with another, if your colony is broodless as well as 'queenless,' which is usually the rule. If your surplus harvest is not all early, and the bees

are still quite numerous, and you have more combs than queens to fill them, it will then pay to get a queen with which to re-queen the colony, if not too costly to procure."

DR. G. L. TINKER remarks thus: "Queenless colonies in early spring should be united with the weakest ones having queens. To unite, select a time just after the bees have had a flight, if cool, or toward evening, if warm; move the colony with the queen to the stand of the queenless colony, and shake the bees of the latter from the combs and hive in front of it. Smoking the bees a little as they go in will insure the safety of the queen. After dark, take the colony to its original stand, and remove the hive and stand of the queenless colony, to some other location."

H. R. BOARDMAN answers thus: "Queenless colonies in the spring should be united with those having a good queen. There are many ways of doing this successfully. A very easy way is to crowd the bees having the queen, upon as few combs as possible, with a division-board; then set the combs containing the queenless colony in the space on the opposite side of the board, leaving only a small hole for communication between the two colonies, when they will unite of their own accord in a short time. Leave the entrance open only to the colony with the queen."

Local Convention Directory.

	Time and place of Meeting.
Apr. 11.—	Wabash County, at Wabash, Ind. Henry Cripe, Sec., N. Manchester, Ind.
Apr. 18.—	Marshalltown, at Marshalltown, Iowa J. W. Sanders, Sec., Marshalltown, Iowa.
Apr. 18.—	Eastern Indiana, at Richmond, Ind. M. G. Reynolds, Sec., Williamsburg, Ind.
Apr. 23.—	Union Ky., at Eminence, Ky. G. W. Demaree, Sec., Christiansburg, Ky.
Apr. 23, 24.—	Western, at Independence, Mo. C. M. Crandall, Sec., Independence, Mo.
April 24.—	Portage County, at Ravenna, O. L. G. Reed, Sec., Kent, O.
Apr. 25.—	Union, at Earlham, Iowa. M. E. Darby, Sec., Dexter, Iowa.
Apr. 28.—	DeMoines County, at Burlington, Iowa. Jno. Nau, Sec., Middleton, Iowa.
May 2.—	Central Illinois, at Jacksonville, Ill. Wm. Camm, Sec., Murrayville, Ill.
May 4.—	W. New York and N. Pa., at Cuba, N. Y. W. A. Sherman, Sec., Randolph, N. Y.
May 4.—	Linwood, Wis., at Rock Elm Centre, Wis. B. Thomson, Sec., Waverly, Wis.
May 7.—	Progressive, at Bushnell, Illa. J. G. Norton, Sec., Macomb, Illa.
May, 7, 8.—	Texas State, at McKinney, Tex. W. R. Howard, Sec., Kingston, Tex.
May 12.—	Cortland Union, at Cortland, N. Y. W. H. Beach Sec., Cortland, N. Y.
May 19.—	N. W. Ills., and S. W. Wis., at Davis, Ills. Jonathan Stewart, Sec., Rock City, Ill.
May 28.—	Mahoning Valley, at Newton Falls, O. E. W. Turner, Sec., Newton Falls, O.
May 28.—	N. Mich. Picnic, near McBride, Mich. F. A. Palmer, Sec., McBride, Mich.
May 29.—	Haldimand, Ont., at Nelles' Corners, Ont. E. C. Campbell, Sec.
June 19.—	Willamette Valley, at La Fayette, Oreg. E. J. Hadley, Sec.
Dec. 8-10.—	Michigan State, at Detroit, Mich. H. D. Cutting, Sec., Clinton, Mich.

In order to have this table complete, Secretaries are requested to forward full particulars of time and place of future meetings.—ED.



Explanatory.—The figures BEFORE the names indicate the number of years that the person has kept bees. Those AFTER, show the number of colonies the writer had in the previous spring and fall, or fall and spring, as the time of the year may require.

This mark (O) indicates that the apistarist is located near the centre of the State named: ♂ north of the centre; ♀ south; ♂ east; ♀ west; and this ♂ northeast; ♂ northwest; ♀ southeast; and ♀ southwest of the centre of the State mentioned.

For the American Bee Journal

The Wintering Problem.

JAMES HEDDON.

While many have wintered their bees successfully part of the time, and others nearly or quite all of the winters that they have been in the bee-business, no one has ever been able to give satisfactory reasons for such success, or, in other words, to lay down a formula by which bee-keepers in other localities, with different food in their hives, could realize the same success. For years, many of us have been studying the problem with the hope of being able to benefit those who now are in the business, by laying down certain directions which, if followed, would give certain success.

The reader will remember that I have stood as one among that number; he will also remember that I have never at any time felt or claimed that I understood the wintering problem; and that I have put forth the theory (not claiming to know) that the cause of bee-diarrhea was the consumption of nitrogen taken by way of bee-bread and floating pollen in the honey during confinement. This has been called "Heddon's Pollen Theory," and has been believed in by many, and disbelieved by many other worthy apiarists.

I am now prepared to say that I think I practically understood the problem, yet I do not claim to be able to give all of the detailed laws connected with it, but I will give the main ones as I understand them, and I will say that the most responsible man in America could not under-write a policy to insure the future wintering of my colonies at 10 cents each. To this satisfactory confidence, I am indebted to Prof. A. J. Cook, and some of the names which I am going to mention, and I may add, to the sharp controversies contained in the BEE JOURNAL, all thrown in, and my costly experiments made during the past two winters.

Before attempting to show the cause of bee-diarrhea and the death resulting therefrom, I wish to take up a few theories—not my own—with a view of showing what it is not.

First, the "hibernation theory:" I cannot better express my convictions upon that theory than by quoting three words from Prof. A. J. Cook: "Bees never hibernate."

Second, the "humidity theory:" Some will remember what I have already written in the BEE JOURNAL about Mr. Balch's damp, moldy bees. A letter from Mr. Boomhower, the successful gentleman quoted by Mr. Cornell, on page 56, contains the following sentence: "I have wintered bees in eight different cellars, some dry and some damp, and always with perfect success, and I never have had a ventilator of any kind in them."

During the past winter I have used two cellars, one containing 40 and the other 91 colonies; both cellars were allowed to become very cold, to test the endurance of bees with sugar syrup; the temperature in the old cellar was down as low as 10° and 15°; in the new, damp cellar, as low as 25°. The old cellar contained bees with sugar syrup only, and of its 40 colonies, ¾ are now dead with no symptoms of diarrhea in any hive. The new, damp cellar containing the 91 colonies has 73 colonies without pollen or honey—sugar syrup only—10 colonies with little pollen, and stores of part honey and part sugar syrup, and 8 colonies having all natural stores. This cellar has been so damp that mold has collected on the alighting-boards and between the combs, on the underside of the covers, etc. About one-third of the colonies have upward ventilation by way of nails pushed under the board covers; the other two-thirds have no upward ventilation whatever. In numerous hives, water can be seen running out on the alighting board. If the covers of those hives which are tight down, are lifted and turned up edgewise, water will run from them. The health of these 91 colonies stands thus: Of the 8 on natural stores, 4 died with the diarrhea, 2 others have the disease so badly that recovery is impossible, and the other 2 are apparently in perfect health. All were treated alike with no upward ventilation. Of the 10 with little bee-bread and mixed stores, 8 are in good health, while 2 have the diarrhea badly. Of the remaining 73, with nothing in the combs but pure sugar syrup, not one shows any signs of diarrhea whatever; all are alive but one, and the cause of its death is yet unknown and unexamined. I am satisfied in regard to the "humidity theory." A low temperature is to be avoided. Dampness being a conductor of heat, tends to aggravate the effects of cold. Dry hives and combs, free from mold, are preferable to the other extreme; therefore, while dampness is objectionable it is "not" the cause of bee-diarrhea.

Third, The "breeding-in-confinement theory:" Years ago I observed that colonies which were the worst affected with bee-diarrhea, as a rule, contained the most brood; and I am to-day quite positive that there is something about breeding, whether in confinement or when the bees fly regularly, that is very depleting to them. So universally had I found my diarrhetic bees with brood in their combs, that I did think that the handling of pollen for breeding purposes, would produce bee-diarrhea; though different from Mr. Doolittle, I did not consider breeding the main cause, but pollen—breeding an auxiliary cause to the use of pollen. The undeniable testimony brought forward by Mr. Cornell, on page 56, as well as what I am about to quote, shows that I was mistaken in this side-issue branch of my theory, and as far as I can see, they entirely up-root Mr. Doolittle's theory. Mr. H. V. Train, who now always winters his bees successfully, and quoted by Mr. Cornell on page 56, under date of March 9, 1885, writes the following to me: "If I can find how to prevent my bees from breeding too much and too early in the cellar, my plan of wintering just suits me. I do not expect that my bees will spot their surroundings when they are put out in the middle of April any more than they would after a long storm in the midst of summer." I could go on with undeniable evidence that bees as Mr. Train writes me, can breed hivefuls of bees while in confinement, without becoming loaded with fecal matter. Some may wonder how this agrees with "the pollen theory." Let me quote from Prof. Cook, dated March 3, 1885: "The fecal mass is mostly in the intestines; sometimes it is so abundant as also to crowd the true stomach. It is not likely that the alimentary

canal back of the honey-stomach, and true stomach, are ever used to form the larval food; I think not, back of the sucking or honey stomach. If the pollen is used up for larval bee-food, it could not appear in feces." Let us all thank the Professor for setting us aright in this respect. I again quote from him relative to something closely connected to the above: "There is no foundation in the dry-feces theory, I am sure." Again: "Bees do not normally void feces in the hive, and never dry feces."

"The pollen theory." What is it? I fear that many do not yet understand what I mean. As I have before stated, my experience with hundreds of dead colonies caused me to suspect that the cause of the disease rested in the food, but "how," was the question. I had unmistakable evidence that the trouble was not with full honey, thin honey, sour honey, uncapped honey, or honey from any special source. I called to mind the fact that honey was a highly oxygenated food; that pollen was as highly nitrogenized; that these two greatly varying substances so radical in their elementary principles, were the only food for our bees, and how well the one fitted the confined state of the bees while the other equally served their demands while growing or repairing the waste of tissue caused by exertion. I also remembered how utterly unfit was either one to serve the purpose of the other. I then grasped the idea that possibly the consumption of nitrogen in confinement was the cause of all the trouble, and that this element was taken when the bees consumed honey (by way of its floating pollen), or in much greater proportion when they consumed bee-bread. I put this forth as a theory only, hoping that a discussion upon it would lead many others into the investigation. As time passed, and opportunity offered a partial test, more and more favorable the theory appeared. Last winter has given us a chance for fully testing this, as well as other theories, and what follows, I think should settle the question. I can see very little room for error. I am quite willing that that "little" should be used for further argument.

As bearing favorable to the "pollen theory," I have given the condition of affairs in my two cellars. I will now state how matters stand with the out-door colonies of this same home apiary. I had 49 colonies, each on 6 American frames with combs, in tenement hives, that in summer contain 19 combs, all resting horizontally. On either side of the 6 combs and bees was a 2-inch chaff, cloth-sided division-cushion; over all, in the upper story, was a large chaff cushion about 6 inches thick. These hives were painted white, and rested high, so that they were above the most of the snow. Twenty-five of them contained no honey, and only a cell of pollen here and there, and well supplied with sugar syrup; 24 contained a little honey and bee-bread, and all the rest of the food was sugar syrup. I had no idea of losing any of these colonies, but in this I was in error, for every one is dead. Among the 25 there is scarcely a sign of disease: the combs are clean and nice. Among the other 24, there is occasionally symptoms of diarrhea, here and there, but nothing to amount to anything. I have had colonies show many times more symptoms of diarrhea and survive, and come up strong for the June honey harvest. None of these colonies died of diarrhea. Of what did they die? Cold, too long continued; and those in the old, cold cellar did the same. But how in a cellar? Cold is a giant in a cellar. Why? Because it continues; there is no ray of sunlight, no immediate raising of temperature, or chance for the bees to change position. What degree can bees stand? That depends upon the duration. Here

is the great point that too many of us have overlooked. Forty degrees below can be endured for a short time, but 10° to 15° above, will kill bees if continued, diarrhea or no diarrhea. In this point I have been in error.

In this same yard stands 17 colonies down lower and warmer packed than the 49 just referred to, all being on full natural stores of honey and pollen, and in the regular 8-frame Langstroth hives. All are dead except 5, and probably not over 2 or 3 of these will survive. All of them had diarrhea badly. Not until we could remove bee-diarrhea, could we get a clear view of any other causes which might result in the death of our bees.

Just to the left stands 73 colonies packed just like the above 17; these had little pollen in their combs, and stores of a mixture of sugar and honey, just the same as the 10 referred to in the new, damp cellar. They, like the 17, are low down, and were pretty well covered with snow during the severe weather. Of these 73 colonies, 5 are dead, and 2 more show signs of diarrhea. All the rest appear free from disease, and are quiet and in good numbers.

Of my out-apriary of 208 colonies, all packed, and all on natural stores, but selected combs (as free from bee-bread as we could conveniently choose), I think at least one-half will die, some of diarrhea, and some of cold with no diarrhea.

But let us go farther. Not satisfied with this, I began sending specimens of excreta to Prof. Cook. The first specimen was excreta from a radical case of diarrhea, with bees all dead, one among the eight which died in the new cellar. I also enclosed some pollen from the comb contained in the frame from whose top-bar I took the excreta. The Professor answers as follows: "I have subjected the pollen to a very careful examination with a one-sixth objective. I find several kinds of pollen grains, two of which are by far the most common. One is oval, rather pointed at the ends with a longitudinal slit and numerous projections; the other is globular and thickly set with projections much like those in the other. I then studied the excreta, and had some one else made the change, I should have stoutly maintained that the objects were the same that I had just studied. The kinds of pollen were exactly the same in style and markings. The pollen you sent had been liberally appropriated by the bees whose excreta you sent."

I will here state that no attempt at breeding had been made by this colony. I will quote from another letter from Prof. Cook: "I went to a neighbor's bees, all of which are dead, and I took three with long, black, turgid bodies and dissected out their alimentary canal as before. The stomach and intestines were fairly bursting with repletion; slight pressure sent the black, odorous excreta flying. This was almost one exclusive mass of pollen-grains held in a watery mixture."

I will now try to make clear the course which will successfully winter our bees with certainty, and preface it with some observations and conclusions formed by myself and others:

1. Ventilation: Prof. A. J. Cook writes to me as follows: "Bees certainly use air all winter, if wintering well; very little will do—perhaps simply what is in the hive, but unless they are kept very quiet, they would need more." Mr. Shirley tells me of an instance of his observation, where a former neighbor of his determined to smother some colonies of bees to get rid of them and to get the honey. With moist blue clay he hermetically sealed the hives, and left them for so long a time that he concluded that the bees must be dead, but when the hive was opened, to his chagrin, they were not only alive, but showed no signs of any ill

effects. This was in September. A recent letter from Mr. Boomhower contains the following words which exactly accords with my observation and experience: "All ventilators to bee-cellars are a damage and amount to nothing. This has been proven to me over and over again."

When I built my new cellar I had a splendid site for the easy construction of sub-earth ventilation, but as I had no proof of any sort to warrant one dollar's outlay in ventilators of any kind, I wanted some, before going ahead. I decided to seek it by corresponding with three men whom I thought stood at the head in the departments of science, theory and practical success as related to apiculture; viz.: Prof. Cook, Mr. S. Cornell, and Mr. E. J. Oatman. Each one of these gentlemen gave what I fully believed to be his honest convictions upon the subject. After weighing them carefully, I could find no argument that caused me to prepare any "site" of ventilation, and now I am very glad that I saved all expense in that direction. I am firmly convinced that no ventilation whatever is needed in a bee-cellar.

2. Temperature is the point upon which much hinges—the point where many of us are still making fatal mistakes. Mr. Boomhower says, "45°"; and Mr. H. V. Train says, "45°, and in the spring it may run up to 60°."

But I think that I hear some one say, "Won't they get uneasy and noisy when the temperature is so high?" Yes, but you have been accustomed to associate noise and uneasiness with disease, where such disease was the cause of such noise and uneasiness; but these effects are sometimes produced by other causes, and in that case will not themselves become a cause of the disease.

I am now talking of just what I know from my experiments this year. Mr. Train avers that this high temperature, later in the season, is accompanied with breeding, in his location, and his only trouble is that he has to give each colony a tablespoonful of water daily, or they will fly out of the hives (evidently in search of it) and fall on the cellar bottom, never to rise. He says that water prevents all of this. Such testimony is evidence enough for me. He further says that early breeding is objectionable, and he wishes a way to avoid it and its consequent labor.

But where does the pollen theory stand in this problem? Just here. As the diarrhetic excreta is pollen, you may know some neglect or violation of rules which I shall lay down for successful certainty in wintering, have caused the bees to eat pollen.

My opinion is, that when the temperature falls below a given point, in the hive, the bees add to the heat-producing method of consumption of oxygenized food, that of producing heat by exercise, and this exercise necessitates waste of tissue, and this, the consumption of tissue-making food (nitrogenous food), bee-bread. By careful examination I have found that in cases where I fed sugar syrup in dry, clean combs, and left these colonies exposed to the severe cold of the past winter, that in every case where there was just a cell of bee-bread here and there which was overlooked or trusted with the bees, they have emptied every one within their reach. I assert the following, being fully persuaded that future discoveries will bear me out in the assertions:

1. If colonies of bees are kept in a room whose temperature never goes below 45° (in some cases I might put it lower), they will not take bee-bread into their intestines, whether they use it for making chyme or not.

2. If the honey which the hives contain is of good wintering quality, that is, very free from floating pollen, this will be all

the precaution necessary to insure safety. But, if on the other hand the oxygen stores contain a goodly quantity of nitrogen, via floating pollen in the honey, the bees may have the diarrhea, and this is the reason that disease has been experienced in warm cellars. If the pollen is diffused throughout the honey in considerable quantity, it will get into the bees' intestines and accumulate in larger quantities than the bees can hold, and their instincts to do this will cause the disease.

To all who believe the above, is it not clear that just two conditions need close watching and enthusiastic cherishing; viz.: sugar syrup stores and a temperature of from 40° to 45°? Sugar syrup is now cheaper per pound than liquid honey, and as a bee-food it goes farther, as it contains heat-producing elements to a greater degree than honey, and enough less nitrogen than the best of honey, that I believe the bees will come out in the spring in a more vigorous condition than those wintered on honey and in a manner called "successful." As I have before written, I am satisfied that what is called "spring dwindling" is contained diarrhea, and so the less bees spot their surroundings on their first flight, the more old bees may we have when we can boast of 40,000 new ones per colony. I notice that as we move northward we find the honey clearer, and fecal accumulations less, according to the duration of confinement.

If pollen had not been a main factor in the cause of fecal accumulations in bees, the whole problem would long ago have been settled. It is now practically settled with me, even if some of the minor bearings are still not quite clear. If I am mistaken, I shall again lose my bees. Let us see.

The natural inquiry now is, what is the best, most practical and cheapest method of changing the winter stores of bees. Knowing by experience that sugar syrup is cheaper and safer than honey as a bee-food, I have for three years been experimenting on the best means of accomplishing the above-mentioned change in the stores. I have reduced to practice a simple system of manipulation that accomplishes the desired change to my satisfaction, without cost, danger, or the trouble of even opening the hives, to say nothing of the almost impractical method of late extraction; and I will detail it in due time, feeling sure that it will meet with favor by all practical honey-producers. Avoid low temperature and nitrogenous food, and success is certain.

Dowagiac, Mich.

For the American Bee Journal.

The Use of Drone-Traps.

HENRY ALLEY.

In their article on page 165, Messrs. Dadant & Son seem to entertain the idea that a drone-trap has no other uses than that of catching drones, when, in fact, that is one of its minor features. They say: "To begin with, let us state, that in bee-keeping as with every business, the aim ought to be to secure the largest result, with the least labor and expense." This is just the view that I took of the matter, and hence the invention of a drone-trap as a labor-saving implement in the apiary. Perhaps Messrs. Dadant & Son could do with fewer men in their apiary if they used the drone-trap, as I will endeavor to show.

They say further: "Mr. Alley does not seem to be in the habit of replacing in his hives the drone-comb by worker-comb, for he writes: 'Would it not be a pretty job to go over 100, or even 50 colonies of bees and cut out the drone-comb and fill the places with foundation?'" The very reason why I made the remark was because I

supposed that every reader of the bee-papers had read many times that drone-comb should be cut out, and, to prevent the bees from building more in the same places, a piece of worker brood-comb should be inserted in its place. I have practiced the same thing for 27 years, and a long time before foundation was thought of.

Again they say: "Our instructions to our men are, as soon as they detect some drone-comb in a hive, to put it at the outside of the other combs, so as to have it on hand when preparing bees for winter, or at the spring visit." How many of the 150,000 bee-keepers in the country can afford to employ men in the apiary? All bee-keepers are not situated as the Messrs. Dadant & Son are, and as they cannot afford to employ help to destroy the drones or drone-comb, the next best and practical thing is a drone-trap, the use of which might save the wages of one or more men during the season. They also say: "Sometimes when a queen is old or sick, or when she lays her first eggs, she lays drones in worker-cells; but the small drones reared would pass through the holes of a drone-trap." I will say that drones reared in worker-cells, whether the eggs are from a barren queen or a fertile worker, are worthless so far as fertilizing a queen; therefore if such drones do pass through the trap, no damage will be done.

I believe as they do, that "the removal of drone-comb is worth many dollars to the bee-keeper;" I always recommend and practice it; but as to my being "reluctant about it," I will say this: I stated that "bees will rear drones when they need them," and the use of foundation will not prevent it, even when placed in the boxes or brood-frames. Now let us see how it works: Last spring I wanted some Italian drones to use early in May. Mr. Pond wrote me that he had one fine colony which had plenty of drones in it, and the colony was sent to me. When it came, I examined the hive and found that the combs were all built on nice wired foundation, and the hive contained a large number of drones. They were reared in cells near the top-bars (I think a V-shaped top-bar was used), down through the bottom of the frame, and through the middle of the comb where the wire was pressed into the foundation. I will cite another case: A bee-keeper in North Carolina sent me 12 3-frame nuclei, and each one contained 3 combs of nice wired foundation, and in many of the combs were little patches of drone-brood right in the center of each frame, as well as considerable near the bottom and the corners.

The above may not be sufficient evidence that bees will rear drones when foundation is used, so I will give still another case: I received a 3-frame nucleus from a bee-keeper in Ohio, and I wanted this nucleus for a special kind of drones, and the combs containing drone-brood were built of worker foundation. Now, I most positively and plainly assert that bees will construct drone-cells by removing worker-cells or foundation when they need drones, though they say that they will not.

They also say that "Mr. Alley rears four kinds of bees in the same apiary;" so far they are correct, but if they intend it to be understood that I rear four races of queens, and have them fertilized in the same apiary, they have been wrongly informed. There are no bees within 6 miles of my apiary except what I own, and all the different kinds are kept by themselves, several miles apart. How could I keep the drones of all the four kinds from going into any of the hives, except by the use of a drone-trap?

One of the best things about the trap is, that such a large space can be given for ventilation, and still leave the hive protected from the annoyance of robber bees, toads or mice, as well as the bumble-bee, and hornet which cause so much trouble to bees during the summer.

They say that "a few years ago, we had all pure bees; one of our neighbors brought, in May, 45 colonies of black bees to within 1½ miles from our apiary, and some of his thousands of drones met with our young queens." Now, suppose that the neighbor had used the drone-trap, as he might, had he known the benefit to be derived from its use, would they not have derived some benefit from it then? If the black bees were 1½ miles from their apiary, I do not believe that one in 100 of their queens would have met one of the black drones of the neighboring apiary.

In a recent number of the BEE JOURNAL I gave a practical, easy and quick way to Italianize an apiary where the trap is used. I will now give a few of the many good features which a good drone-trap combines, to prove that it is a great boon and aid to apiarists, and that the reasons given by Messrs. Dadant & Son are founded on mere theory.

The drone-trap is not a "nuisance":

1. Because it effectually entraps and destroys every drone.
2. Because a hive can be more easily and better ventilated when the trap is used than by any other method, and it will not be necessary to raise the hive from the bottom-board or move the boxes back; and all hives can be ventilated at the entrance — the proper place.

3. Because queens can be mated by the drones from any colony desired, and fertilization is completely under the control of the apiarist.

4. Because when a swarm issues the queen will be entrapped and returned to the hive, and there is not a case on record where a queen was ever injured under such circumstances; and no queens having defective wings will be lost in the grass, as is the case often when a swarm issues.

5. Because the trap can be placed at the entrance of any hive, and the bees will not be in the least annoyed thereby, as it does not prevent them from passing out and in freely; and, if placed on the hive at night or early in the morning, the bees will mark the location, and not one will enter a neighboring hive.

6. Because the trap, when placed on the hive, needs no attention oftener than once a month.

7. As the first cost is comparatively nothing, and the advantages gained each season by using them, are worth many times the cost.

8. Because they are a sure protection against the enemies of bees, and a great protection against robbing.

9. Because the apiarist, when he desires to go from home, can do so with no fear of losing his bees in case a swarm issues, as the bees will return to the hive in a short time.

10. Because the apiarist is not obliged to go up into a tree 30 or more feet to secure the bees when they swarm; and for this reason old people, whether men or women, can keep bees and not run the risk of life or limb to hive them in such a case.

11. Because if the apiarist is busy at work and the bees swarm, he will not be obliged to run at once to hive them, but can act at his own pleasure about it.

12. Because a colony when it issues can be compelled to settle just where the apiarist desires them to.

13. Because when placed at the entrance of a hive wherein a swarm has just been placed, the bees cannot decamp to the woods.

14. Because when a swarm issues, the bees can be easily and quickly hived by removing the parent colony to a new location, and placing the new hive on the old stand, when the bees, missing their queen, will return and enter the new hive, and all trouble is ended, as soon as the queen is liberated.

15. Because if one desires a few fine drones from a distant apiary for experiment, he can place a trap at the entrance of a hive, and in an hour have several hundred of the desired drones.

16. Because the trap is a perfect non-swarming arrangement.

I might extend this list of reasons, but let this suffice. The readers now have both sides of the trap question, and I will leave them to judge as to its being a nuisance.

Wenham, Mass.

For the American Bee Journal.

The Season of 1884.

J. M. HAMBAUGH.

The season of 1884 was one of cold comfort to the bee-fraternity in this section, especially back from the river bottom where the prairie bloom was not accessible. The bees built up early, and made a fair showing of success, but this fair promise was of short duration, their labors ceased with the clover harvest, and a very small part of the colonies stored sufficient to last them through the fall and winter; hence, many bee-keepers were compelled to feed through the fall in order to keep them from starving, and where this was neglected, the bees went into winter quarters in bad condition to withstand the rigors of the past long, cold winter, and that coupled with bee-diarrhea, which has been very prevalent throughout the country, has played sad havoc among the bees.

As to my own experience during the past season: I began the season with 55 colonies, 23 of which were set off and prepared for the production of extracted honey, and the balance for comb honey. I had to transfer all of my colonies from 8-frame hives to 10-frame ones, and alter every frame, as they had been made nearly $\frac{1}{2}$ of an inch too deep; this was to make a uniform frame throughout the yard, and to meet the exact standard dimensions, $17\frac{1}{8} \times 9\frac{1}{8}$ inches; to do this I, of course, had to furnish every hive with two extra frames filled with foundation. The 23 colonies were prepared with a second story, the dimensions of which were exactly the same as the brood-chamber, with ten frames wired and filled with full sheets of foundation.

All the colonies built up very rapidly, and appeared to be none the worse off from the transferring, which was done prior to fruit bloom, and before the white clover harvest came in the hives were overflowing with bees, ready to improve every opportunity. The surplus arrangements were put on about May 20, and to cause the bees to enter the upper story more readily, I put a frame of brood from below into the upper story, which insures their acceptance of the situation. For comb honey, I use the "tiering-up" system with skeleton honey-board, etc., inside of an upper story, the same as for extracting; by this means I can use the half-pound, one-pound and two-pound sections in the same hive, and can utilize the same hive for extracting, with the standard-size brood-frames, the advantages of which are obvious.

During the season I extracted at four different times, and from the 23 colonies I obtained 2,390 pounds of extracted honey; and from the balance of the apiary I secured about 1,600 pounds of comb honey in one-pound and two-pound sections, making my total harvest nearly 4,000 pounds. I also increased my apiary to 61 colonies by natural swarming.

Have I not done pretty well? My neighbors look upon my figures with

an incredulous eye, especially when they reason that very few bees in the country have furnished sufficient honey for family consumption. Finally the stale accusation of adulteration has been sprung, and the wiseacres are happy. The mystery is solved. Hambaugh has been stuffing his bees—feeding them sorghum molasses and cheap Orleans sugar! I am glad to say, however, that the better class of citizens know this to be false, yet it has had its effect upon the market. I was foolish enough to put some honey on the market in the early part of the season, which was gathered from honey-dew, which damaged me, and gave the slanderers some room for their wholesale accusations.

I bought quite a number of colonies of bees during the summer and fall, and I had 87 colonies to put into winter quarters; the most of them were kept in a house constructed of corn-fodder, straw and prairie hay. Signs of bee-diarrhea were prevalent in December, and on Jan. 5 the bees had a flight, after which I again put them into their winter quarters. The flight helped them, but it was not long ere the same restless spirit prevailed, and this, added to the intense cold weather through January and February, has proven very disastrous. Twelve colonies out of the 87 are already dead, and several more are likely to die. I put them upon the summer stands on Feb. 27, and the foul odor from their discharges was sickening. We have had several days of warm sunshine of late, throughout this section, which has helped the bees very much, yet there seems to be great losses of bees in this part of the country.

Spring, Ills., March 5, 1885.

For the American Bee Journal

Not the Way to Argue.

WM. F. CLARKE.

I have been hoping for sometime that Prof. Cook would be "inwardly moved" to express his views on the subject of hibernation. At length he has spoken, but so briefly and oracularly as to be exceedingly disappointing. In Query No. 13, I find the following: "Prof. A. J. Cook remarks thus: 'Bees never hibernate.' I have characterized this utterance as brief and oracular. A very slight addition to it would have greatly improved it. If the Professor had said, 'I think,' or 'in my opinion, bees never hibernate,' I would not have had a word of fault to find with the style of 'remark.' But it is as if an oracle had spoken!"

Prof. Cook is an authority both on entomology and apiculture, and a very high one, but an oracle he is not. We do not have such in this day and age of the world, on any subject in regard to which there is room for holding honestly differing opinions. If a man dissents from any view of mine, I am glad to have him express his dissent with the reasons for it, but I do not want him to come at me with an air

of infallible wisdom, as if the matter were settled for all time and for all eternity. If he does, I shall rebel, as I am now doing. Self-respect compels it. No man holds Prof. Cook in higher esteem than I do, but I must enter a protest against this method of dealing with any subject of debate among intelligent, thinking, and independent-minded men.

In the very next column, on page 85, Mr. E. B. Southwick uses the same language: "Bees never hibernate." Gentlemen, this kind of talk won't do. It is not becoming. The modesty of true science, as well as the courtesy we owe to those who differ from us, forbids it. I have before me at this moment, two scientific works. One says: "Hive-bees probably do not hibernate." The other says: "The common hive-bee is probably never, strictly speaking, torpid, though with regard to the precise state in which it passes the winter, a considerable difference of opinion has obtained." I command these examples to Messrs. Cook and Southwick, hoping that they will "amend the record."

Prof. W. F. Kirby, one of the most eminent of living entomologists, referring to the phenomena of hibernation, observes: "Every gradation may be met with between ordinary sleep, the imperfect or abnormal hibernation of some animals, and the profound hibernation of others, in which all the functions of life are suspended." I have never claimed that bees go into a state of "profound hibernation," but only that they experience one of its "gradations." It may be a very imperfect degree of hibernation that they experience, but that they fall into a state similar in some respects to it, I do not think Prof. Cook will deny. It has been proved beyond successful contradiction, that there is a reduction of vitality, a suspension of activity, a species of torpor, a very slight exercise of certain natural functions, exceedingly small consumption of food, and if any discharge of feces, only in the form of a minute powder. By the way, Prof. Cook is reported to have said at the Michigan State Convention, that it is absurd to suppose that bees discharge dry feces during the winter. If they do not, then they must retain in their bodies the excremental remains of what food they consume during the months of their winter imprisonment in cellars and bee-houses. I might call this absurd, but instead of so doing, I will take it as an admission by Prof. Cook of one of the phenomena of that state into which he affirms they "never" enter.

I am not contending for the use of a particular word. "For names and forms let graceless zealots fight." But if "bees never hibernate," what is it they do when they relapse into comparative quiescence, eating so little honey that 2 or 3 pounds have sufficed for the use of a strong colony during the entire winter? If hibernation is not the proper term to designate this condition, what is? The only other word I know of which is employed by scientific men to designate a similar condition, is "aestiva-

tion," but that applies to summer, and not winter torpor. It seems that certain animals have a fashion of drowsing away the hottest period of the year, as others are wont to do the coldest.

Perhaps it would be well to coin a word, now that among other things we are trying to settle a correct nomenclature of bee-keeping. If hibernation is open to any serious objection, or a better word can be found to express the idea, all right. Let us have a preferable substitute. "What's in a name?" "A rose by any other name would smell as sweet." But the *thing itself*—the state of quietude, torpor, or semi-torpor, into which bees are wont to subside when the surroundings are favorable, which render them contented and comfortable with small rations, and brings them out of winter quarters bright, clean, thrifty and vigorous—it is the "*how, why and what*" of *that*, which I am after, as the key to the winter problem. That this *is* the key, I have no doubt whatever, at the present time. If "bees never hibernate," they do something which I have called by that name for want of a better, but if Prof. Cook or any one else is prepared with a better name for it, a name which all bee-keepers will accept as indicating *the thing*—let us have it right away. The only substitute I have met with, as yet, is "Clarke's Rheumatic Dream," but I cannot say that I have fallen in love with *that*, because I deem it a reality.

Speedside, Ont.

For the American Bee Journal

The Arrangement of Hives.

C. M. HOLLINGSWORTH.

There are several considerations of economy, convenience and protection to the bees to be looked to in the method of placing hives in an apiary; and some suggestions on this point may be of value at this season of the year.

Last year, with 150 hives in two apiaries, I adopted a method of arrangement which I have never seen recommended nor mentioned by apicultural writers, and which, I think, possesses a number of decided advantages. The hives were placed in pairs, the two hives of each pair being very close together on a common stand, and the pairs arranged in regular rows at what I deemed sufficient distances apart each way. The advantages of this arrangement are these:

1. In the matter of identifying their own hives, I found, as I had expected, that the bees are not at all likely to make the mistake of going into the wrong hive of the pair to which they belong. This was plainly seen when a swarm which had issued, after circling awhile in the air, would return without clustering. The most of the bees would go back to their own hive, but in the confusion some would go wrongly; but they always went to the corresponding hives of other pairs near by, and not to the

wrong hive of the same pair; and, indeed, there is little more reason why they should make this latter mistake than that they should forget in what part of their own hive the entrance is situated. Thus it will be seen that pairs of hives may be placed as near together as single hives, without trouble arising from bees mistaking the hive to which they belong. This gives a great economy of the ground occupied by the apiary, and of the travel required in working in it.

2. A stand can be as easily made for two hives as for one, and will be more stable. I use Langstroth hives, and my stands consist of four wooden stakes driven into the ground, leaving 6 or 8 inches projecting, thus forming a rectangle about 15 inches by 3 feet, and with two 4-foot pickets nailed against the sides of their tops. Across the pickets the hives are placed, the front picket being an inch lower than the back one. By the use of a level, and by lowering any of the stakes that may need it, after they have been driven in by guess, a stand of this kind is easily made of any desired height, made perfectly level laterally, and having any desired pitch from rear to front; and it will remain true without any further attention throughout the season.

3. The placing of hives in pairs greatly facilitates the protection of their contents from both heat and cold. My hives have the ordinary Langstroth cap, and I use the Heddon cases as supers. When the heat of summer comes on, by simply taking out one side of each cap, and putting the cap on each hive with the open side toward its companion hive, very efficient protection is afforded to the cases both from too great heating by the sun in the day-time and too great cooling by radiation at night, or on cool, cloudy days. The inner sides of the cases and caps of each pair of hives protect each other in both these ways, while there is a chance for sufficient circulation of air around the cases to moderate the heat of the sun at mid-day. When more than one case is on, if the honey-board has no cleats to serve the purpose, it is a little better to have cleats or nails driven part way in, on the under side of the top of the cap, to support it a little above the honey-board, giving an air-space between. The remaining three sides of each cap give protection to the outer side and ends of the case over which the cap is placed, or to the upper case and the upper part of the next one beneath, where there is more than one case on. The removed side of the cap can be made to serve a useful purpose by leaning it against the outer side of the hive, resting on the ends of the picket supports; and in the fall it may be partially nailed in its place on the cap to give better protection to the top of the hive. This modified cap is easily and quickly slipped off and on horizontally, or nearly so, thus avoiding the objections to the telescoping arrangement; and it requires no weight on it to keep it from being blown off by the wind, as the open side is always sheltered from the wind. It

has this further advantage over the wide shade-board held in place by a heavy stone—by inverting it upon the ground, one of its corners affords a narrow support on which to place the cases, without danger of crushing many bees, while working in the brood-chamber. The placing of hives in pairs also gives similar advantages, and especially a great saving of material in the protection of the bees from cold by packing around the hives, etc., in the fall, winter or spring. By packing well the small space between the hives and putting a single close division-board in the outer side of each hive, better protection is afforded than two division-boards will give in a single hive standing alone, and this is all that is needed for fall or spring, where bees are wintered in a cellar. Where they are left out through the winter, by also packing the space under the hives, putting stakes, or stakes and boards, near the back end of each pair and filling in with straw, and putting a few inches of chaff or leaves in the caps, very nearly an equivalent of the very best chaff hives is secured for wintering with very little labor and expense, and with the use of a comparatively small amount of packing material.

4. With hives in pairs, as free access as there is any need of may be had to every hive; while in working with any hive its companion hive is a handy stand on which to place the requisite tools. I find a wooden tray, made of a honey-board with a narrow rim nailed on around its edges very convenient for carrying smoker, smoker-wood, screw-drivers, jack-knife, etc., around in the apiary. By tacking some yielding supports on the under side of this, such as a small roll of cloth near each end, it can be set on the top of a hive, and articles taken from it and put back upon it, without jarring the hive enough to disturb the bees.

It will be seen that all the advantages which I have here specified, resulting from the placing of hives in pairs, are such as tend to simplify and minimize the work required in attending to large apiaries.

Winnebago, Ills.

For the American Bee Journal.
Bees and Clover.

C. M. WEED.

Darwin and other eminent observers have repeatedly demonstrated that the flowers of most plants must be cross-fertilized with pollen from flowers of other plants of the same species, to produce the most and best seed. Repeated experiments have been made to determine whether seeds would form without this cross-fertilization, and the result has usually been that very few or none have set; especially is this true of our common red clover which is, as a rule, fertilized, or pollinated as some would have us say, by bumble-bees. All are familiar with the oft-repeated tale of the introduction of bumble-bees into Australia, in order that clover seed might be produced there instead of

importing it annually. Much the same effect has been observed in certain portions of our own country respecting the introduction of Italian races of bees. The tongues of these banded foreigners being longer than those of the native blacks, they could reach the nectar at the base of the clover corollas, and as a consequence they foraged upon it and aided the bumble-bees in their work of cross-fertilization.

Rev. L. L. Langstroth, so fittingly called the Father of American apiculture, once told the writer that about Oxford, Ohio, the area over which the Italian bees foraged was plainly indicated by the increased production of clover seed.

A few years since, Dr. W. J. Beal, who introduces his students every year into the great fields of original investigation, requested some of them to investigate the comparative number of seeds set by clover with and without the presence of bees. In one of these instances eight heads which had been protected from insect visitors, yielded only five seeds, while eight neighboring unprotected heads yielded 236 seeds. Other experiments pointed to the same conclusion. The Doctor, in referring to the subject in one of his public addresses, said: "These experiments, with those of Darwin and others, make it appear as though bees helped to fertilize the flowers of white and red clover, and cause the plants to set seeds more freely. If bumble-bees do more good than harm, as we have very good reason to believe, we should encourage their production. Bumble-bees prefer the old nests of meadow mice. It has been suggested that we should not keep cats nor allow hawks, foxes and dogs to catch these mice, which make nests so necessary for the bumble-bees which help fertilize our red clover."

If this be true, should not the howl of discontent so frequently raised against apiarists, by some farmers and fruit-growers, be speedily silenced? These persons claim that the bees in foraging on their lands steal the sweets from their crops without any recompense; but they do not realize that in the very act of the so-called theft, the bee repays them a thousand times for the paltry sweet which nature has placed there for this very purpose. At the recent meeting of Illinois horticulturists, it was stated that one of the most prominent fruit-growers of the State considered the presence of bees essential to a full crop of fruit, and many present coincided in the opinion. Would those worthy agriculturists whose indignation rises apace at the fancied loss imposed on them by their neighbor's bees, prefer to have their meadows over-run with meadow-mice to furnish breeding places for bumble-bees, that would certainly trouble grazing cattle nearly as much as would the imported Italians?

Chicago, Ills.

The Mahoning Valley Bee-Keepers' Association, will hold its next meeting at Newton Falls, Ohio, on Thursday, May 28, 1885.
E. W. TURNER, Sec.

For the American Bee Journal.

The Origin of Honey-Dew.

CHARLES SAMSEL.

On page 139, Mr. Kemp asks me to explain how honey-dew gets into the leaves of some plants and trees. This I answer, Yankee fashion, by asking other questions, viz: How does blood get into our system? How does the milk get into the cow? How does nectar get into flowers? Answer—Not by absorption; they are the result of the wonderful chemistry of nature. All plants and trees contain more or less sap, some is sweet, some sour, and some insipid; when the sap flows—it often overflows, thus running down the trunks of trees; all the gum-resins exude spontaneously from trees, some are very odiferous, and we frequently find sweet moisture on leaves, where no *aphidae* are visible, this may be expelled through the pores of the leaves, as sweat from the human body.

Mr. K., in support of his saccharine-condensation theory, cites the aroma from the sugar-camp, the coffee-pot, the cabbage in the dinner-pot, and the fragrance of the rose, and leaves us to infer that these aromas are condensed and absorbed by plants.

Aroma is a term employed to designate those substances, the extremely minute particles of which are supposed to affect the organ of smell so as to produce particular odors. The particles diffused through the atmosphere and affecting the olfactory nerves—if the theory of particles of matter so diffused be correct—must indeed be extremely minute. These odors have been generally supposed to depend upon essential oils.

Scientists tell us that odors of flowers do not, as a general rule, exist in them as a store, or in a gland, but are developed as an exhalation. While the flower breathes, it yields fragrance; but kill the flower, and fragrance ceases. It seems then that odors are simply exhalations dependent—possibly all—upon essential oils, not upon vapor impregnated with matter, and cannot, therefore, be condensed as such, and we have yet to learn that these exhalations are visible or leave the least stains; and while it is well known that they combine with various fatty matter, they do not sensibly increase their weight or bulk.

If the aromas of which Mr. K. speaks, were like smoke, depositing carbon; or like steam, depositing water, when condensed, they would most likely form deposits upon other substances, besides leaves, but they are not analogous, the former being much too minute to produce those deposits which we style honey-dew.

As already stated, this honey-dew is either spontaneous exudation of vegetation, or is drawn from it by *aphidae* and ejected as such. Many trees and shrubs—as admitted by Mr. K.—secrete sweet sap and furnish food for insects, etc. The sweet saps are absorbed by the *aphidae*, and again ejected by them, falling upon objects

within reach, usually upon the leaves of the plants which they infest, often upon those adjacent, and upon the ground. I quote the following from Messrs. Kirby & Spence's Entomology: "This fluid, which is scarcely inferior to honey in sweetness, issues in limpid drops from the abdomen of these insects, not only by the ordinary passage, but also by two setiform tubes, placed one on each side, just above it.

We all know that the bee does not make honey, but simply gathers it from flowers; when it obtains its sweets from sugar, it deposits sugar, not honey. The value of honey-dew to the bee, therefore, depends upon the source whence the *aphidae* obtain it. Much more might be said in refutation of the saccharine-condensation theory, based upon sound scientific principles, but as nothing very satisfactory has yet been shown in support of it, I deem it unnecessary."

Easton, Pa.

For the American Bee Journal.

Planting for Honey.

C. H. DIBBERN, (200).

Just now it seems that our leading bee-masters are much interested in the discussion of their "pet theories." One insists that it is all "pollen," another "hibernation," and a third "continuous passage-ways," while a fourth declares that the brood-combs must be tipped upside down, or the bees will pay no profit. All these questions have caused a great deal of thought among intelligent apiarists, and will doubtless lead to some good; but most of us, however, who keep bees for the money that there is in it, have not the time nor patience to pick the pollen out of brood-combs, that the foolish bees will persist in bringing in, to their own injury; or to be continually "tilting" the combs or watching the bees through the long winter to see if they really "hibernate." What we want to know is, how to produce the most honey of the finest quality, and in the best possible shape. Many of us know how anxiously we have watched the last few days of the white clover and linden-honey-flow, and how we have looked about us in vain for something to take its place, as the last few blossoms dried up. Ordinarily a season of five or six weeks follows when the bees have nothing to do but cluster idly about the fronts of the hives, leaving great numbers of sections only about half finished, to be completed in the fall with dark honey which finds a poor demand at a low price.

It has been my study for many years, how it would be possible to prolong the period of the white honey harvest. Some fifteen years ago, while musing on this subject, my attention was drawn to a small patch of melilot or sweet clover, growing in a garden which I was passing. Seeing a great many bees working on it, I felt like shouting "Eureka!" I did not then know what it was, but I gathered some of the seed and have

scattered it in all out-of-the-way places ever since. I find, however, that it is difficult to get started where cattle are allowed to run; but not so with the Rocky Mountain bee-plant. Much can be done by utilizing all the waste places, but I have not depended on that alone. Last season I had about two acres of sweet clover adjoining my apiary, and while it was in bloom it was a beautiful sight. At one time fully one-half of my bees were at work upon it. This was at the most important part of the season, and the bees were enabled to finish many sections that would have remained only partially completed. It is plain that whatever we can add to the natural honey resources, must nearly all go into the sections or combs for extracting. Not so with the general crop; a great deal of that is consumed by the bees.

Now, as to the question, "Does planting for honey pay?" I can answer "yes." I am certain that ten acres of sweet clover would have been worth \$500 to me last season. What crop is there that will pay better? There is also some demand for the seed, and if taken care of and advertised, it will pay all the expenses of cultivating. Then, too, the satisfaction of having the bees at work so industriously, and producing the snowy white combs, while they would otherwise be idle, or intent only on robbing, is worth something. In my opinion, planting for honey is the direction in which the greatest promise of success lies.

Milan, Ills.

For the American Bee Journal.

North Middlesex, Ont., Convention.

The North Middlesex Bee-Keepers' Association met in the Town Hall, at Park Hill, Ont., on Friday, March 20, 1885.

Messrs. D. A. and G. B. Jones were present, and answered numerous questions; the former also spoke at length on preparing honey for market. The discussions were both interesting and exhaustive, and embraced the usual subjects brought forward at conventions.

The election of officers resulted as follows: President, Mr. Frank Atkinson, of Ailsa Craig; Vice-President, Mr. D. P. Campbell, of Park Hill; Secretary-Treasurer, Mr. A. Humphries; Vice-Presidents for Park Hill, Messrs. Henry Phippen and Jas. Gray; and for Ailsa Craig, Messrs. D. Norton and J. Allen.

It was decided to hold the next meeting at Ailsa Craig, Ont., about the middle of May, 1885.

D. A. STEWART, Sec.

The second annual meeting of the Western New York and Northern Pennsylvania Bee-Keepers' Association will be held at Cuba, N. Y., on Tuesday, May 4, 1885. A very large attendance is anticipated, as the territory covered by this Association embraces many prominent bee-keepers.

W. A. SHEWMAN, Sec.

**SELECTIONS FROM
OUR LETTER BOX**

Report, from D. L. Shapley, Randalville, N. Y., on March 28, 1885:

I have wintered 22 colonies of bees, and I fed 130 pounds of sugar last fall. The last season was a very poor one in this locality; basswood did not blossom any, and all that the bees gathered was from white clover. The weather has been very cold, and there is much snow on the ground now.

Hibernation of Hedgehogs and Porcupines.—Dr. E. B. Southwick, Sherman, Mich., in referring to an article on page 186, writes thus:

Chambers' Encyclopedia, in giving an account of the porcupine, says: "It burrows in the ground, and in winter it becomes torpid." Again, of the hedgehog it says: "In winter the hedgehog becomes torpid, retiring to some hole at the base of a tree, beneath roots, or in some such situation. It provides no winter stores, and no other British animal hibernates so completely." I have never heard of a hedgehog in this country. It is a small animal, only 9 or 10 inches long; but porcupines, which are from 2 to 3½ feet in length, are more plentiful here than the skunk or woodchuck, but they are not seen in winter unless found in their burrows.

Still Cold.—C. E. Miller, (76-65), Edella, Pa., on March 23, 1885, writes:

My bees have been confined to their hives for 82 days, and still no signs of their having a flight. I have 20 colonies in the cellar, which seem to be all right, and perfectly quiet. Those which are out-doors are the ones that alarm me. I took a peep at some of them to-day, and I found that 2 of the number examined were dead. The most of them appeared to be all right, a few showed signs of diarrhea, and some had soiled the combs and the inside of their hives. It has been very cold here since Feb. 1. I think that the past winter was worse than that of 1880-81. On Sunday morning, March 22, the mercury was 8° below zero.

Wintering Bees.—Rev. J. Kearns, Morning Sun, Iowa, writes as follows on this subject:

The question of the safe wintering of bees has given bee-keepers more annoyance than any other one question. All plans have, in some localities and in some seasons, failed; the most imposing theories have proved more or less unsatisfactory. To this vexed subject I have given special attention for a number of years, and I have succeeded in managing my bees so that I am satisfied that I can winter them safely in any locality, and during the most severe winter. I put 2 colonies in one box with a

porous partition between them, and from 3 to 5 inches of packing around and over them. The advantage of this is that of getting the heat of 2 colonies of bees together, and this, with good packing, makes the hive so nearly frost-proof that the bees lie quiet, even when the thermometer is 30° below zero, and a severe gale blowing from the northwest. I have tested this plan for five winters, two of which were exceedingly fatal on bees, and I have wintered some quite weak colonies with what I considered poor food, and yet I have never lost a colony since following this plan. The past winter has been the most severe one ever known in this locality—so say the oldest settlers—nearly three-fourths of all the bees in this locality being dead, and still I wintered 52 colonies without any loss, and most of them with the loss of comparatively few bees. These colonies faced the south, north and west, with the entrances fully open as in summer.

Report, from Charles Mitchell, Molesworth, Ont., on March 30, 1885:

Mr. Doolittle's statement, on page 181, is the strongest that I have ever met with. Each winter I have about 15 colonies next to a fence, and I have yet to lose my first colony. There is generally 5 feet of snow over them, and the full summer entrance to the hive is given them, and a 3-inch cushion over the frames. I have about concluded that bees are pretty hard to kill, for out of 53 colonies examined, I lost only 3, 2 colonies having starved for want of winter passages, and 1 perished with diarrhea.

Bees Confined 120 Days.—Henry Alley, Wenham, Mass., on March 26, 1885, says:

We are having warmer weather now, but not warm enough for the bees to have a flight. The bees in my bee-house have been confined for 120 days, but they are in good condition.

Careless Bee-Keepers., etc.—Robert Corbett, Manhattan, Kans., on Mar. 28, 1885, says:

On account of having been sick from Feb. 1 until March 10, I think that I have lost quite a lot of bees for the want of attention. I have lost 2 nuclei with valuable queens, and 6 colonies, 4 of which were lost on account of robbing and loss of queens. The loss of bees in this locality is great, being about, I should think, four-fifths of all; and I may say, through carelessness. There is about 2 inches of snow on the ground, and my bees are still shut up. I would like to know why it is that one of two equally strong colonies in one location, during a certain season, will produce 100 lbs. of honey, while the other will produce only from 30 to 50 lbs. I think that it must be that different colonies prefer different kinds of flowers. I have pretty thoroughly tested this during the past 3 years. In this locality, in dry seasons, the bees

store a peppery kind of honey—so peppery that when one eats it, it burns the throat. It is unsalable and unfit to eat. In 1882 I had 2 colonies that stored this kind of honey while the remainder of the apiary (some 30 colonies) had none of it. In 1883 I had 3 colonies of this kind, and all the rest stored good, sweet honey; while the past season was such a poor one, and the bees were obliged to supply stores for their winter support, that all, excepting 3 colonies, worked on the ironweed, and consequently what surplus they stored, was useless except for feeding back. I think that this tends to prove that bees prefer to choose the flowers upon which to work.

Report, from Wm. Dyke, Effingham, Ills., on March 25, 1885:

My 34 colonies have come through the winter, but they are a little weak. I have just finished moving them from my farm to my residence in town, and now that we have open weather I can work them up for the coming honey crop.

Visiting California Apiaries.—Mrs. B. Stover, Roscoe, Ills., writes as follows:

Two years ago last December my husband and myself went to Southern California, where he hoped to spend a pleasant winter and visit some of the apiaries which he had seen described in the bee-papers; but the climate did not agree with him, and he gradually grew worse from the time of alighting from the cars in Los Angeles. We visited but one apiary, which was situated a few miles from Santa Monica; and, although it was during the month of January, it was as warm, and the bees were flying as lively as if it were the latter part of May here. Instead of returning in April or May, as he expected to attend to his own bees, he lingered along until June 7, and on June 9, I buried him in the Ojai Valley (15 miles from San Buenaventura), beneath the shade of the live-oak, and amid the ceaseless hum of the "busy bee," whose tiny music ever delighted his ear. It seems hard to dispose of his bees, and I shall miss them, as they have been a part of the family for the past ten years.

Report, etc., from J. W. Howell, Kenton, Tenn., on March 27, 1885:

This has been a long, cold winter, but I have lost only 10 colonies of bees, and the remainder have been gathering pollen for two or three days from maple and elm, they being the only blooms that are out yet. Vegetation is at least one month later than usual. The bees are at work today. We only need good weather for awhile, when plenty of nectar for the bees to gather will be the result. There are those who think that bees may freeze and be all right by thawing out again, but like Mr. Anderson, page 188, I think that they will sometimes freeze, but after that they are of no value—only the hive and combs may be of service again.

Report, from F. W. Schafer, Eddyville, ♀ Iowa, on March 24, 1885:

Bees in this part of Iowa have wintered very poorly. Last fall I put about 75 colonies into winter quarters, and I have lost 20 colonies; with the exception of 2 or 3 colonies, all died with the diarrhea.

Bees Flying Every Day.—Mrs. S. C. Tyler, Utica, ♂ Mo., on March 29, 1885, says:

My bees are flying every day. They seem to be as busy as if the world was filled with blossoms, though they get nothing but pollen.

Hives and Separators.—J. H. Andre, Lockwood, ♀ N. Y., writes thus:

Use a "Simplicity" or Langstroth body with a flat cap just deep enough to cover a thick cushion; make the half-story to fit the same as the full story "Simplicity." Put in cross partitions and use any size of boxes that you wish. If the lumber of the half-story is one-sixteenth of an inch thicker, it will make it a trifle smaller inside, and the boxes will not bind on the lower story when putting them on. I like this style of hive for the following reasons: As it has a flat cover the hives may be placed upon one another; the half-story and crate are one. One gets the full size of the hive for boxes instead of using the room for a crate; and if the half-story is not desired, it may be laid aside at any time. The hive takes up but little room for in-door wintering, which I consider much cheaper and safer than wintering on the summer stands. Separators may be dispensed with if the sections are not over $1\frac{1}{4}$ inches wide, if the sections are filled with foundation. Separators take up room, and there must be a space for the bees on both sides of them, instead of only one space where they are not used. The $4\frac{1}{4} \times 4\frac{1}{4}$ sections will average about 14 ounces with separators, and about 17 ounces without them. A section $1\frac{1}{8}$ inches wide will hold more honey without separators than one $1\frac{1}{8}$ will with separators, and you get more sections on a hive, and the bees will work better and fill all of them more nearly at the same time instead of leaving some unfinished.

Lost Only One Colony.—D. R. Rosebrough, Casey, ♂ Ills., on March 17, 1885, writes as follows:

This has been a very severe winter on bees, and a great many bee-keepers have lost all that they had; one man told me that he had lost 37 colonies out of 42. I had 45 colonies last fall, and I now have 44 which are in good condition. I have some Cyprian drones flying. I never had so few bees die, as I swept up only about 2 gallons of bees and litter from the cellar floor. I do not see why my neighbors lost so many bees, and I none, comparatively, and when the bees had the same flowers to work on last season. I think that the secret is in the management. I use a one-and-one-half story hive, and I left the

caps on all of them, laid 3 or 4 slats across the frames and spread oil-cloth over the slats, and packed over the oil-cloth with chaff cushions. Any time that I would raise the oil-cloth, the bees were all over the tops of the frames, and could move from one to the other just as they wished. I did not allow any snow to lie around my hives. The hives are made of 1-inch pine lumber, and they were left on the summer stands. I left all of the pollen in that they had stored in 10 Langstroth frames, and the bees reared brood all through January and February, and to-day there is lots of brood in all stages in the hives, and plenty of young bees, too. They will use a gallon of Graham flour a day. This winter my bees had the very best of honey to winter on. The bees that died did not have the diarrhea, for I have examined hives in apiaries where the loss was the heaviest, and there was no sign or smell of diarrhea, and the honey was bright and clean. Where the loss is the heaviest the bees were in box-hives, and the bee-keepers did not try to keep the snow away from them, and we have had some heavy sleets during the past winter. My colonies were well equalized last fall with bees and honey. There were 3 colonies that had nothing over them but the oil-cloth, and to-day they are 15 to 20 pounds lighter than those that were packed. I still think that pollen has nothing to do with wintering bees, for if they have good honey and proper care, they will come through all right.

**Report, from Andrew Quist, Ho-
kah, ♂ Minn., on March 30, 1885:**

My loss of bees during the past winter is 9 colonies, 4 colonies being queenless and 5 having starved. I put 74 colonies into winter quarters last fall, and the 65 remaining colonies I think will come out in good condition. They had a good flight last week.

Bees in Good Condition.—F. R. Manning, Reynolds, ♂ Ills., on March 23, 1885, writes:

My bees are all in good condition so far. All except 10 colonies had a flight recently, and they were breeding strong, and some had capped brood. I have lost only 2 colonies this winter, and they were 3-frame nuclei. As many colonies have died in this section this winter as during the winter of 1880-81. Almost all of those colonies wintered on the summer stands have died. One of my neighbors has lost 25 colonies out of 40 that were wintered on the summer stands. What little I have used foundation, has convinced me that I can get straighter and nicer combs with it than without it. Last June I hived a swarm on 8 frames filled with foundation, on Monday, on Tuesday I put on 28 two-pound sections, and in 13 days after I put on the sections, I took off 17 two-pound sections filled and capped as nice as any I got during the whole season. They had the 8 frames filled with brood and honey, and then I put in two empty frames,

and they filled them, and they did not work any more in the sections. When I packed them away in the fall, I took out those 2 frames, which contained as nice straight combs, filled clear to the bottom-bar, as I ever have seen, and the honey is as white as white clover honey can be. I am wintering my bees in the cellar with oat-chaff packed over the brood-chambers. I recently asked a bee-keeper how his bees were wintering, and he said that they had all frozen to death. I told him that they had starved to death, and by examining the hives, I found that there was not 10 pounds of honey in his 12 hives. Careless bee-keepers will lose hundreds of colonies. I have not fed my bees any yet, but perhaps I will have to feed some in the spring.

Not Discouraged.—I. A. Draper, Dawson, ♂ Nebr., on March 25, 1885, writes:

Last spring I began with 15 colonies, and during the season I increased them to 29 colonies. The past winter being a very severe one, I have only 10 colonies left; however, I am not discouraged. As bees in this section did not produce much honey last season, I anticipate a good yield during the coming season.

Bees are Swarming.—J. Y. Detwiler, New Smyrna, ♂ Fla., on March 23, 1885, says:

Bees are swarming in some apiaries here. At 3 p. m. to-day the mercury was 60° above zero, with the wind from the north. Bees are inclined to be quiet.

Report, etc., from Chas. Harrold, (15-36), Hamburg, ♀ Iowa:

My bees are doing well. We have had a very cold winter, and for 34 days during December and January, it was continuously cold, and after that the bees had a good flight; then we had another cold wave for 12 days in February. The following is a description of my reversible frame which I prefer to any that I have yet seen: The top and bottom bars are made just alike, as are also the end-bars; bore 2 gimlet holes in each of the 2 end-bars, about 2 inches from their ends. The reversing device consists of 2 pieces of common fence-wire for each frame, which are put into the gimlet holes, then bent upward, parallel with the end-bars, and then horizontally outward from the ends of the top-bar, thus forming projections which rest on the hive rabbits. This style of frame is more easily made than the common hanging frame, and I find no objections to it in handling. In answer to Mr. S. Daniels (page 103), the man who could not find the queens, I would say: Put a drone and queen trap at the entrance of the hive, take out all of the frames, shake the bees in front of the hive, and then the queen may be found on the zinc after the bees have entered the hive. In Italianizing colonies, I never take the time to look up the black queens.

Almost a Total Loss.—Messrs. Chas. Dadant & Son, Hamilton, Ills., on March 28, 1885, writes thus:

Bees are in bad condition, but we are better off than our neighbors. The loss in this neighborhood is almost total; ours is $\frac{1}{4}$ —the most that we have ever experienced.

Report, from Prof. A. J. Cook, Agricultural College, Mich.:

Our bees seem to have wintered nicely. Thanks to a good cellar and little or no pollen. The bee-mortality in this State will be very great.

Convention Notices.

The Central Illinois Bee-Keepers' Association will meet at Jacksonville, Ills., at 10 a. m. on Saturday, May 2, 1885. **W.M. CAMM, Sec.**

The Spring meeting of the Cortland Union Bee-Keepers' Association will be held in Cortland, N. Y., on May 12, 1885. **W. H. BEACH, Sec.**

On account of the prevalence of small-pox in St. Joseph, Mo., the semi-annual meeting of the Western Bee-Keepers' Association, will be held at the Court House, in Independence, Mo., on April 23 and 24, 1885. **C. M. CRANDALL, Sec.**

The Northwestern Indiana Bee-Keepers' Association, will meet on Wednesday, April 8, 1885, at 10 a. m., in the Jury Room at the Court House in Laporte, Ind.

A. FAHNESTOCK, Sec.

The Union Kentucky Bee-Keepers' Society will hold their spring meeting in Grange Hall, at Eminence, Ky., on Thursday, April 23, 1885. All are cordially invited to attend.

G. W. DEMAREE, Sec.

The Progressive Bee-Keepers' Association of Western Illinois will meet in Bushnell, Ills., on Thursday, May 7, 1885. Let every bee-keeper who can, be present and enjoy the meeting.

J. G. NORTON, Sec.

The Willamette Valley Bee-Keepers' Association will hold its second meeting at La Fayette, Oregon, on the third Tuesday in June, 1885. All who are interested are invited to attend. **E. J. HADLEY, Sec.**

The Wabash County Bee-Keepers' Association will hold its spring meeting in the Court House at Wabash, Ind., on Saturday, April 11, 1885, commencing at 9 a. m. All who are interested in bee-culture are cordially invited to attend. **H. CRIPE, Sec.**

The bee-keepers of Portage county and vicinity will meet at Ravenna, Ohio, on April 24, 1885, for permanent organization. Let every bee-keeper be present.

L. G. REED, Sec.

The next meeting of the Union Bee-Keepers' Association of Western Iowa, will be held on April 25, 1885, at Earlham, Iowa. **M. E. DARBY, Sec.**

The Texas State Bee-keepers' Association will be held on Thursday and Friday, May 7 and 8, 1885, at the apiary of Judge W. H. Andrews, at McKinney, Tex. All interested in the advancement of apiculture, are earnestly requested to be present and make this a memorable meeting of the Association. **W. R. HOWARD, Sec.**

Special Notices.

We beg leave to inform our patrons and the public generally, through the BEE JOURNAL, that Mr. L. S. Hildreth has been admitted a partner in our firm, and the firm's name is now McCaul & Hildreth Bros. Our stock now is light, and from the present outlook, we will be able to close out our present stock of the 1884 crop, before the warm weather sets in. We now feel confident that we can handle considerably more next season, as we intend to make honey a specialty. **MC CAUL & HILDRETH BROS.**
New York, March 31, 1885.

Our rates for two or more copies of the book, "Bees and Honey," may be found on the Book List on the second page of this paper. Also wholesale rates on all books where they are purchased "to sell again."

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Single copy, 5 cts.; per doz., 40 cts.; per hundred, \$2.50. Five hundred will be sent postpaid for \$10.00; or 1,000 for \$15.00. On orders of 100 or more, we will print, if desired, on the cover-page, "Presented by," etc., (giving the name and address of the bee-keeper who scatters them).

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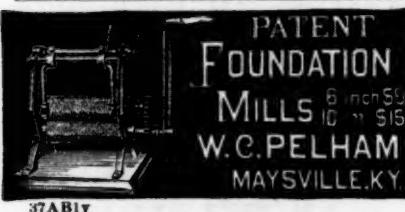
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